SD 11
.S9R4
no.86-15

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE
RO

REPLY TO: 3420

DATE: August 19, 1986

SUBJECT: Biological Evaluation of Pest Conditions in Stand 15, Rush Creek Compartment, Groveland Ranger District (Report No. 86-15)

TO: Forest Supervisor, Stanislaus National Forest

At the request of Dwaine Nebeker and John Schmechel, Groveland Ranger District, Gregg DeNitto and John Dale of the Forest Pest Management Program examined Stand 15 in the Rush Creek Compartment for existing and potential insect and disease problems. A prescription is being written for this stand by Schmechel as part of his silvicultural certification. The stand was previously visited by FPM and documented in a 3430 memo of November 1, 1984.

This mixed conifer stand borders Highway 120 and must be managed as part of a view zone. In addition to visual quality, maintaining watershed and riparian values are primary objectives. Uneven-age management systems are required to maintain these values.

The overstory is approximately 90 to 110 years old. It is comprised primarily of ponderosa pine, white fir, and Douglas-fir. These same species plus incense-cedar, sugar pine, and California black oak occur in the understory.

Schmechel's principal concern was whether annosus root disease was present in the stand and, if so, how the stand can be managed to minimize future damage. His concern was based on pockets of recent mortality and windthrow of white fir in the stand. In the previous evaluation, it was suspected that F. annosus may be present, but no evidence could be found.

In one mortality pocket near the highway three large white firs had died over the past 2 to 3 years. Stumps from earlier salvage were within the pocket. Above ground symptoms of mortality resembled what is observed with annosus root disease, caused by Fomes annosus. Examination of the stumps and roots of the dead trees did not reveal any evidence of this root disease. In the cambium zone of the butts and roots of the dead trees, however, were mycelial fans and rhizomorphs of Armillaria sp., the cause of a different root disease. This disease had not been identified in the 1984 evaluation.

Nearby, but outside of the mortality pocket, a white fir was uprooted by the wind during the past winter. In the process, it struck and

partially uprooted a second white fir. The windthrown tree had extensive root and butt decay attributable to Armillaria root disease. The structural roots had a central decay column around which healthy wood and cambium was growing down from the root collar. This healthy wood ended abruptly within several feet of the root collar and only dead, decayed wood extended further. Roots on the second white fir were similar. It appeared that the central core of the structural roots were being decayed, but additional healthy wood and cambium were being produced outside of the decayed core. This appeared sufficient to maintain the health of the tree, but the loss of root strength resulted in tree failure.

We believe this stand can be successfully managed to minimize further impact of Armillaria root disease and meet other management objectives. Because of the apparent root decay and lack of above ground symptoms from this disease in this stand, it is not possible to determine the extent of the infestation and what impacts it may have. Information in the literature on this disease tends to be contradictory and the situation in California appears somewhat different than other parts of the world where the disease exists. Also, we have limited knowledge of the disease in California forest stands and its role in white fir management. However, the following is our best assessment on how to approach management of this disease in Stand 15.

Within mortality pockets, small group selection cuts could remove dead trees and surrounding white firs whose roots may be decayed but whose crowns appear healthy. These pockets should be regenerated with ponderosa pine and a smaller proportion of Douglas-fir. In aggregates of dense white fir outside of mortality pockets, single tree selection that would thin the aggregates lightly would be appropriate. Too heavy a thinning could result in windthrow if the root systems are decayed by Armillaria. Thinning the stands rather than leaving them undisturbed would have two positive effects on pest conditions. First, competition and resulting stress would be reduced, minimizing the possibility of attacks by some insects and subsequent mortality. Second, increased growing space could accelerate root development and increase the wind firmness of residual trees. If other requirements preclude the use of single tree selection, then group selection in these overstocked aggregates would be satisfactory. However, it would be best to minimize the number of residual white firs on the boundary of the patch cuts because of possible windthrow and sunscald.

In addition to Armillaria root disease, several other diseases were noted in the previous report. Consideration of these diseases in stand management does not differ from what was earlier provided.

Two other diseases were observed in the stand that were not causing symptoms in the 1984 evaluation. Black stain root disease, caused by Ceratocystis wageneri, had infected a sawtimber-size Douglas-fir. This infection will result in mortality of this tree. This strain of the causal fungus is specific to Douglas-fir. Because this stand is near the southern limit of the range of Douglas-fir and the species

will not comprise a large proportion of the future stand, this disease should not have any impact on management options. Sugar pine seedlings and saplings were infected by blister rust, Cronartium ribicola. This disease will cause the death of these size classes of sugar pine. It appears that the disease is on the increase in the Sierra Nevada. It is recommended that regeneration of non-rust resistant sugar pine not be encouraged in this stand. If a local rust resistant seed source is available, it could be planted with reduced risk of subsequent infection. During timber marking in this stand, any pole-size and larger sugar pines should be retained, if possible, because they will be the only sugar pines likely to survive into the future stand if rust resistant stock is not planted.

If you have any questions about the suggested management practices or other information presented above, please contact Gregg DeNitto of my Program at 415-556-6940.

Richard S. Smith

RICHARD S. SMITH, JR.
Acting Program Leader for
Forest Pest Management